WE CLAIM:

1.   An electrical power management architecture for managing an electrical power distribution system comprising:

        a network;

        at least one intelligent electronic device ("IED") coupled with a portion of said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with said portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

            a first network interface operative to couple said at least one IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network; and

            a security module coupled with said first network interface and operative to prevent unauthorized access to said power management data;

        said architecture further comprising:

        a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function.

2.   The electrical power management architecture of Claim 1, wherein said electrical power distribution system comprises a utility electrical power distribution network.

3. The electrical power management architecture of Claim 1, wherein said electrical power distribution system comprises a consumer electrical power distribution network.

4. The electrical power management architecture of Claim 1, wherein said network comprises a publicly accessible communications network.

5. The electrical power management architecture of Claim 1, wherein said network comprises a Transport Control Protocol/Internet Protocol ("TCP/IP") based network.

6. The electrical power management architecture of Claim 5, wherein said network further comprises the Internet.

7. The electrical power management architecture of Claim 5, wherein said network comprises an intranet.

8. The electrical power management architecture of Claim 1, wherein said IED comprises an electric (watt-hour) meter.

9. The electrical power management architecture of Claim 8, wherein said electric (watt-hour) meter comprises a revenue meter.

10. The electrical power management architecture of Claim 1, wherein said IED comprises an a protection relay.

11. The electrical power management architecture of Claim 1, wherein said IED comprises:

a legacy electric (watt-hour) meter; and

a monitoring and control device coupled with said legacy electric (watt-hour) meter.

12. The electrical power management architecture of Claim 1, wherein said IED comprises a phasor transducer.

13. The electrical power management architecture of Claim 1, wherein said electrical power management function comprises monitoring of electrical power consumption on said portion of said electrical power distribution system.

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14. The electrical power management architecture of Claim 13, wherein said monitoring comprises monitoring by a supplier of said electrical power.

15. The electrical power management architecture of Claim 13, wherein said monitoring comprises monitoring by a consumer of said electrical power.

16. The electrical power management architecture of Claim 13, wherein said electrical power management function further comprises computing revenue.

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17. The electrical power management architecture of Claim 16, wherein said electrical power management function further comprises reporting said revenue.

18. The electrical power management architecture of Claim 13, wherein said electrical power management function further comprises computing usage.

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19. The electrical power management architecture of Claim 18, wherein said electrical power management function further comprises reporting said usage.

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20. The electrical power management architecture of Claim 1, wherein said electrical power management function comprises monitoring electrical power quality on said portion of said electrical power distribution system.

21. The electrical power management architecture of Claim 20, wherein said electrical power management function further comprises reporting power quality events monitored on said portion of said electrical power distribution system.

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22. The electrical power management architecture of Claim 1, wherein said electrical power management function comprises measuring at least one phasor parameter of said portion of said electrical power distribution system.

23. The electrical power management architecture of Claim 1, wherein said electrical power management function comprises controlling electrical power flow on said portion of said electrical power distribution system.

24. The electrical power management architecture of Claim 23, wherein said electrical power management function further comprises controlling electrical generation systems coupled with said portion of said electrical power distribution.

25. The electrical power management architecture of Claim 23, wherein said electrical power management function further comprises controlling loading on said portion of said electrical power distribution system.

26. The electrical power management architecture of Claim 1, wherein said power management data comprises power consumption data.

27. The electrical power management architecture of Claim 1, wherein said power management data comprises power quality data.

28. The electrical power management architecture of Claim 1, wherein said power management data comprises status data of said IED.

29. The electrical power management architecture of Claim 1, wherein said power management data comprises phasor data.

30. The electrical power management architecture of Claim 1, wherein said power management data comprises at least one power management command to at least one other of said at least one IED.

31.   The electrical power management architecture of Claim 1, wherein said at least one power management command comprise tariff/billing data for use in computing at least one of revenue or cost.

32.   The electrical power management architecture of Claim 1, wherein said at least one power management command comprise control commands to control said portion of said electrical power distribution system.

33.   The electrical power management architecture of Claim 32, wherein said control commands comprise de-energizing said portion of said electrical power distribution system.

34.   The electrical power management architecture of Claim 32, wherein a first of said at least one IED is further coupled with a load, said load being further coupled with said portion of said electrical power distribution system, and further wherein said control commands further comprise commands to connect and disconnect said load from said portion of said electrical power distribution system.

35.   The electrical power management architecture of Claim 1, wherein said electrical power management function comprises monitoring electrical power reliability.

36.   The electrical power management architecture of Claim 1, wherein said electrical power management function comprises monitoring IED inventory and geographic location.

37.   The electrical power management architecture of Claim 1, wherein said IED further comprises first computer logic including a protocol stack, said protocol stack comprising:

        an application layer;

        a transport later;

        a routing layer;

a switching layer;

an interface layer.

38. The electrical power management architecture of Claim 37, wherein said application layer comprises at least one application, said at least one application being operative to punch through a firewall.

39. The electrical power management architecture of Claim 37, wherein said application layer comprises an electronic mail application and wherein said power management data is transmitted and said at least one power management command are received as at least one electronic mail message.

40. The electrical power management architecture of Claim 39, wherein said application layer further comprises said security module, said security module comprising an encryption application operative to encrypt said at least one electronic mail message which comprise power management data prior to said transmission onto said network and decrypt said at least one electronic mail message which comprise at least one power management command upon receipt from said network.

41. The electrical power management architecture of Claim 40, wherein said at least one electronic mail message each comprise first and second portions, said first portion associated with a first key and said second portion associated with a second key, and wherein said first key is operative to allow access to said first portion only and said second key is operative to allow access to said second portion only.

42. The electrical power management architecture of Claim 41, wherein said first portion includes said second portion.

43. The electrical power management architecture of Claim 39, wherein said application layer further comprises said security module, said security module comprising an authentication application operative to augment said

power management data electronic mail messages with authentication data prior to said transmission onto said network and authenticate said at least one power management command upon receipt from said network.

44. The electrical power management architecture of Claim 43, wherein said authentication application comprises a cellular modem operative to determine a geographic location of said IED, said authentication data including said geographic location.

45. The electrical power management architecture of Claim 39, wherein said authentication data includes a geographic location ID.

46. The electrical power management architecture of Claim 37, wherein said application layer comprises an extensible markup language ("XML") application and wherein said power management data is transmitted and said at least one power management command is received as XML documents.

47. The electrical power management architecture of Claim 37, wherein said application layer comprises a hypertext transfer protocol ("HTTP") application and wherein said power management data is transmitted and said at least one power management command is received as HTTP hypertext markup language documents.

48. The electrical power management architecture of Claim 37, wherein said application layer comprises a file transfer protocol application and wherein said power management data is transmitted and said at least one power management command is received as data files.

49. The electrical power management architecture of Claim 37, wherein said application layer comprises an instant messaging protocol application and wherein said power management data is transmitted and said at least one power management command is received as instant messages.

50. The electrical power management architecture of Claim 37, wherein said application layer supports peer to peer communications with at least one other of said IED's over said network.

51. The electrical power management architecture of Claim 37, wherein said application layer comprises a simple object access protocol ("SOAP").

52. The electrical power management architecture of Claim 37, further comprising a secure sockets layer ("SSL").

53. The electrical power management architecture of Claim 37, further comprising an S-HTTP layer.

54. The electrical power management architecture of Claim 37, wherein said transport layer comprises a Transport Control Protocol.

55. The electrical power management architecture of Claim 37, wherein said routing layer comprises an Internet Protocol.

56. The electrical power management architecture of Claim 55, wherein said routing layer further implements quality of service protocols.

57. The electrical power management architecture of Claim 37, wherein said switching layer further implements quality of service protocols.

58. The electrical power management architecture of Claim 37, wherein said interface layer further comprises an Ethernet interface.

59. The electrical power management architecture of Claim 37, wherein said interface layer further comprises a dial up modem.

60. The electrical power management architecture of Claim 37, wherein said interface layer further comprises a cellular modem.

61. The electrical power management architecture of Claim 60, wherein said cellular modem is further operative to provide geographic location information of said IED to said application layer.

62. The electrical power management architecture of Claim 37, wherein said interface layer further comprises a Bluetooth interface.

63. The electrical power management architecture of Claim 37, wherein said interface layer further comprises an AC power line communications interface.

64. The electrical power management architecture of Claim 37, wherein said interface layer further comprises an RF interface.

65. The electrical power management architecture of Claim 1, wherein said power management application comprises a centralized power management application.

66. The electrical power management architecture of Claim 1, wherein said power management application comprises a distributed power management application.

67. The electrical power management architecture of Claim 1, wherein said power management application comprises a peer to peer power management application.

68. The electrical power management architecture of Claim 1, wherein said power management application comprises an application program interface to allow at least one power management application to interface with said electrical power management architecture.

69. The electrical power management architecture of Claim 1, wherein said security module is further operative to encrypt power management data generated by said IED onto said network and decrypt at least one power

management command received by said IED from said network and wherein said power management application comprises an encryption application operative to encrypt said at least one power management command transmitted onto said network and decrypt said power

5   management data received from said network.

70.   The electrical power management architecture of Claim 69, wherein said security module and said encryption application comprises pretty good privacy ("PGP").

71.   The electrical power management architecture of Claim 69, wherein said
10   security module and said encryption application comprises prime number based encryption algorithms.

72.   The electrical power management architecture of Claim 69, wherein said encryption application comprises elliptical curve based encryption algorithms.

15   73.   The electrical power management architecture of Claim 69, wherein said at least one power management command and said power management data each comprise first and second portions, said first portion associated with a first encryption key and said second portion associated with a second encryption key, and wherein said first key is operative to allow access to
20   said first portion only and said second key is operative to allow access to said second portion only.

74.   The electrical power management architecture of Claim 73, wherein said first portion includes said second portion.

75.   The electrical power management architecture of Claim 1, wherein said
25   security module is further operative to augment said power management data transmitted onto said network with authentication data and authenticate said at least one power management command received from

said network and said power management application comprises an authentication application operative to augment said at least one power management command transmitted onto said network with authentication data and authenticate said power management data received from said

5   network.

76.   The electrical power management architecture of Claim 1, wherein said power management application implements quality of service protocols.

77.   The electrical power management architecture of Claim 1, wherein said power management application is capable of substantially simultaneously

10   receiving power management data from a plurality of said at least one IED.

78.   The electrical power management architecture of Claim 1, wherein said power management application comprises a data collection server coupled with said network and operative to receive said power management data.

79.   The electrical power management architecture of Claim 78, wherein said data collection server is operated by a customer of said electrical power

15   distribution system.

80.   The electrical power management architecture of Claim 78, wherein said data collection server is operated by a provider of said electrical power distribution system.

20   81.   The electrical power management architecture of Claim 78, wherein said power management data is transmitted as electronic mail messages, said data collection server further comprising an electronic mail server.

82.   The electrical power management architecture of Claim 81, wherein said data collection server is further operative to receive said electronic mail

25   messages and automatically extract said power management data into a database coupled with said data collection server.

83. The electrical power management architecture of Claim 81, wherein said electronic mail server further comprises a Microsoft exchange server.

84. The electrical power management architecture of Claim 78, wherein said power management data is transmitted as hypertext transfer protocol documents, said data collection server further comprising a hypertext transfer protocol server.

85. The electrical power management architecture of Claim 78, wherein said power management data is transmitted as data files, said data collection server further comprising a file transfer protocol server.

86. The electrical power management architecture of Claim 78, wherein said power management data is transmitted as extensible markup language documents, said data collection server further comprising an extensible markup language server.

87. The electrical power management architecture of Claim 78, wherein said data collection server further comprises a phasor processor.

88. The electrical power management architecture of Claim 1, wherein said power management application comprises an automated meter reading application.

89. The electrical power management architecture of Claim 88, wherein said automated meter reading application further comprises a billing management application.

90. The electrical power management architecture of Claim 89, wherein said billing management application transmits a command to each of said at least one IED over said network to cause said at least one IED to transmit billing data to said billing management application over said network.

91.   The electrical power management architecture of Claim 89, wherein each
        of said IED's transmit billing data to said billing management application.

92.   The electrical power management architecture of Claim 91, wherein said
        IED's transmit said billing data according to a pre-defined schedule.

5   93.   The electrical power management architecture of Claim 91, wherein said
        IED's transmit said billing data in response to a pre-defined event.

94.   The electrical power management architecture of Claim 88, wherein said
        automated meter reading application further comprises a consumption
        management application.

10   95.   The electrical power management architecture of Claim 94, wherein said
        electrical power distribution system distributes power generated by a first
        supplier, said consumption management application operative to switch
        said electrical power distribution system to distribute power from a second
        supplier in response to a cost of said power from said first and second
15   suppliers.

96.   The electrical power management architecture of Claim 94, wherein said
        consumption management application is operative to reduce consumption
        on said portion of said electrical power distribution system in response to
        rate changes.

20   97.   The electrical power management architecture of Claim 94, wherein said
        consumption management application is operative to monitor and track
        costs associated with consumption on said electrical power distribution
        system.

98.   The electrical power management architecture of Claim 97, wherein said
25   consumption management application is operative to monitor and track
        costs in substantially real time.

99.   The electrical power management architecture of Claim 1, wherein said power management application comprises a load management application.

100.   The electrical power management architecture of Claim 99, wherein said load management application is operative to connect and disconnect loads to/from said electrical power distribution system.

101.   The electrical power management architecture of Claim 100, wherein said load management application is further operative to disconnect loads during high rate periods and connect loads during low rate periods to reduce electrical power costs.

102.   The electrical power management architecture of Claim 100, wherein said load management application is further operative to disconnect loads during high demand periods and connect loads during low demand periods to reduce electrical power demand.

103.   The electrical power management architecture of Claim 1, wherein said power management application comprises an electrical power generation management application.

104.   The electrical power management architecture of Claim 1, wherein said power management application comprises an IED inventory application.

105.   The electrical power management architecture of Claim 104, wherein said IED comprises a cellular modem operative to determine a geographic location of said IED, said IED inventory application operative to receive and store said geographic location information.

106.   The electrical power management architecture of Claim 1, wherein said power management application comprises an IED maintenance application.

107. The electrical power management architecture of Claim 1, wherein said power management application comprises an IED fraud detection application.

108. The electrical power management architecture of Claim 1, wherein said power management application comprises an IED authentication application.

109. The electrical power management architecture of Claim 1, wherein said power management application comprises a power quality monitoring application.

110. The electrical power management architecture of Claim 109, wherein said power quality monitoring application is operative to monitor for degradation of power quality across said electrical power distribution system.

111. The electrical power management architecture of Claim 110, wherein said power quality monitoring application comprises a local power quality monitoring application on a first of said at least one IED and operative to detect degradation on said portion of said electrical power distribution system and report said power degradation to a second of said at least one IED.

112. The electrical power management architecture of Claim 111, wherein said second of said at least one IED is downstream of said first of said at least one IED on said electrical distribution system and further wherein said degradation comprises a catastrophic power quality event, said first of said at least one IED operative to warn said second of said IED's of said catastrophic event.

113. The electrical power management architecture of Claim 109, wherein said power quality monitoring application is operative to detect faults in said electrical power distribution system.

114. The electrical power management architecture of Claim 109, wherein said power quality monitoring application is operative to correct faults in said electrical power distribution system.

115. The electrical power management architecture of Claim 109, wherein said power quality monitoring application is operative to locate faults in said electrical power distribution system.

116. The electrical power management architecture of Claim 109, wherein said power quality monitoring application is operative to isolate faults in said electrical power distribution system.

117. The electrical power management architecture of Claim 116, wherein said power quality monitoring application is further operative to control at least one protection relay coupled with said electrical power distribution system.

118. The electrical power management architecture of Claim 1, wherein said power management application comprises a power distribution system reliability monitoring application.

119. The electrical power management architecture of Claim 1, wherein said security module is further operative to prevent said IED from responding to an unauthorized of said at least one power management command.

120. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one revenue meter coupled with said electrical power distribution system and further coupled with said network, each of said at least one revenue meter operative to implement a power management

function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one revenue meter comprising:

a first network interface operative to couple said revenue meter with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a peer to peer power management application coupled with said network and operative to receive and process said power management data from said at least one revenue meter and generate said at least one power management commands to said at least one revenue meter to implement said power management function.

121. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and

operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application comprising a load management application.

122. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising an electrical power generation management application.

123. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising an IED inventory application.

124. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data

and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising an IED maintenance application.

125. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising an IED fraud detection application.

126.   An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising a power quality monitoring application.

127.   An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data,

each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function, said power management application further comprising a power reliability monitoring application.

128. An electrical power management architecture for managing an electrical power distribution system comprising:

a network;

at least one intelligent electronic device ("IED") coupled with said electrical power distribution system and further coupled with said network, each of said at least one IED operative to implement a power management function in conjunction with a portion of said electrical power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at least one IED comprising:

a first network interface operative to couple said IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network; and

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command

to said at least one IED to implement said power management function, said power management application further comprising a power outage application.

129. A method of managing an electrical power distribution system, said electrical power distribution system comprising an electrical power management architecture, said architecture comprising a network, at least one intelligent electronic device ("IED") coupled with a portion of said electrical power distribution system and further coupled with said network, and a power management application coupled with said network, said method comprising:

(a) implementing a power management function with each of said at least one IED in conjunction with said portion of said electrical power distribution system;

(b) generating power management data from said power management function;

(c) securing said power management data from unauthorized access;

(d) transmitting said secured power management data over said network;

(e) receiving said secured power management data by said power management application;

(f) authenticating said secured power management data;

(g) processing said authenticated power management data;

(h) generating at least one power management command by said power management application;

(i) securing said at least one power management command from unauthorized access;

(i) transmitting said secured at least one power management command over said network;

(j) receiving said secured at least one power management

command by at least one of said at least one IED;

(k) authenticating said secured at least one power management command;

(l) responding to said authenticated at least one power

5 management command to implement said power management function.